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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/611,896	07/03/2003	Yu-Chou Lee	MR3029-77	3708
4586	7590	07/22/2004	EXAMINER	
ROSENBERG, KLEIN & LEE 3458 ELLICOTT CENTER DRIVE-SUITE 101 ELLICOTT CITY, MD 21043			TRAN, THIEN F	
			ART UNIT	PAPER NUMBER
			2811	

DATE MAILED: 07/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/611,896

Applicant(s)

LEE ET AL.

Examiner

Thien F Tran

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 9-12 is/are allowed.
- 6) ☒ Claim(s) 1-7, 13 and 14 is/are rejected.
- 7) ☒ Claim(s) 8 and 15 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____.  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-3, 5-7 are rejected under 35 U.S.C. 102(e) as being anticipated by Maeda et al. (US 2002/0176032).

Maeda et al. discloses the claimed thin-film transistor structure (Fig. 3c), at least essentially mainly comprising: an insulating substrate 31; a gate electrode 21 on said insulating substrate; a dielectric layer 33 over said gate electrode; a first semiconductive layer 221 on said dielectric layer; a second semiconductive layer 222 on said first semiconductive layer; a first conductive layer 231 on said second semiconductive layer; a second conductive layer 232 on said first conductive layer, said second conductive layer is used as a source 23 and a drain 24; a third conductive layer 233 on said second conductive layer; and an opening through said second semiconductive layer, said first conductive layer, said second conductive layer and said third conductive layer and exposing said first semiconductive layer.

Regarding claim 2, Maeda et al. further discloses said gate electrode 21 comprising an AlNd gate electrode 211.

Regarding claim 3, Maeda et al. further discloses said dielectric layer 33 comprising a silicon nitride layer.

Regarding claim 5, Maeda et al. further discloses said second semiconductive layer 222 comprises an N-type amorphous silicon layer.

Regarding claim 6, Maeda et al. further discloses the first conductive layer 231 formed of TiN that is a known material used for a diffusion barrier layer. As a result, it is inherent that the first conductive layer 231 can prevent said second conductive layer 232 and said second semiconductive layer 222 from diffusing into each other.

Regarding claim 7, Maeda et al. further disclose said third conductive layer 233 formed of TiN which is a known material used for a glue layer and an etch stop layer. Therefore, it is inherent that the third conductive layer 233 of TiN can be used as a glue layer and an etch stop layer to protect said second conductive layer 232 from being over-etched.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 4, 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maeda et al. (US 2002/0176032) in view of Hayama (USPN 5,416,341).

Maeda et al. as described above further discloses the first semiconductor layer 221 comprising an amorphous silicon layer. Maeda et al. does not expressly disclose

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the amorphous silicon layer 221 being a hydrogenated amorphous silicon layer.

Hayama discloses thin film transistors comprising a hydrogenated amorphous silicon active layer. It would have been obvious to a person having ordinary skill in the art at the time the invention was made to form the amorphous silicon layer 221 of a hydrogenated amorphous silicon layer as taught by Hayama in order to have low leakage current between the source and drain regions.

Maeda et al. further discloses the second conductive layer 232 formed of AlNd.

***Allowable Subject Matter***

Claims 9-12 are allowed.

Claims 8 and 15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: prior art references do not teach or render obvious a thin film transistor structure comprising a first conductive layer, a second conductive layer and a third conductive layer together forming a sandwich structure of AlNdN, AlNd and AlNdN alloys.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thien F Tran whose telephone number is (571) 272-1665. The examiner can normally be reached on 8:30AM - 5:00PM Monday through Friday.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C Lee can be reached on (571) 272-1732. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

tt  
July 18, 2004



**THIENTRAN  
PRIMARY EXAMINER**